Final Report
Submitted January 31, 2018

A. Project Information

Report Type
Final
Time Period Covered
January 1, 2015 – December 31, 2017
Project Title
Plant Nutrients in the Classroom
Grant Number
14-0481-SA

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B. Objectives

1. Engage marketing partners such as the Discovery Museum Science and Space Center of Sacramento (Powerhouse Science Center) and other science centers to teach CFAITC's plant nutrient lessons to students attending afterschool programs and to encourage teachers to utilize CFAITC lessons in their classrooms.
2. Engage a public relations agency to develop and implement promotion strategies for CFAITC's plant nutrient lessons to education audiences throughout the state.
3. Advertise in California Science Teacher Association publication, California Agriculture Teacher's Association Golden Slate newsletter, and other educational publications.
4. Engage an evaluation specialist to measure the number of teachers and students reached through promotional activities, and what students learned using CFAITC plant nutrient resources.
5. Provide 60 educators in the Bay Area and Southern California with grade appropriate lab kits for use with plant nutrient lessons.
    a. CFAITC will purchase materials and assemble lab kits specific for each of the following FREP-sponsored, plant nutrient units:
        - K-3 grade: *Educator's Guide to Fun with the Plant Nutrient Team*
        - 2-4 grade: *What Do Plants Need to Grow?*
        - 5-8 grade: *Too Much? Too Little?*
        - 9-12 grade: *Chemistry, Fertilizer, and the Environment*
6. Require teachers receiving the lab kits to participate in a survey which will allow CFAITC to understand what students are learning from plant nutrient lessons.

7. Engage the California Fertilizer Foundation (CFF) to help distribute and promote CFAITC's lab kits and plant nutrient units to teachers in their garden grant program.
8. Identify science centers to supply with lab kits and plant nutrient units.
9. Establish a web page containing CFAITC developed and approved resources relating to plant nutrients. On average, more than 5,000 visitors access resources from CFAITC's website every month.
10. Participate in a minimum of three educator conferences to network with science, technology, engineering, and math educators and to promote plant nutrient units.
11. Print an appropriate supply (over a three-year period) of plant nutrient units:
    - 3,000 copies of *Educator's Guide to Fun with the Plant Nutrient Team*
    - 3,000 copies of *What Do Plants Need to Grow?*
    - 3,000 copies of *Too Much? Too Little?*
    - 1,500 copies of *Chemistry, Fertilizer, and the Environment*

C. Abstract

As a $43.5 billion industry, California continues to lead the nation in agriculture production. Challenges within the industry are numerous and California producers continually investigate the solution to feeding a growing population with finite resources. With these challenges in mind, it is increasingly important for farmers and ranchers to produce food, clothing, forest and floral products on less land for more people. Plant nutrients play a crucial role in improving agricultural efficiency.
This project included updating four comprehensive plant nutrient units, grade levels K-12, to current California Education Standards, sharing the updated units with current and new audiences, working with science centers throughout the state to train teachers and use the curriculum in their summer and afterschool programs, and creating new packaging to draw interest to the program.

At the completion of the project, we distributed 7,500 physical copies and 1,200 digital copies of the updated units.

D. Introduction

As a $43.5 billion industry, California continues to lead the nation in agriculture production. Challenges within the industry are numerous and California producers continually investigate the solution to feeding a growing population with finite resources. With these challenges in mind, it is increasingly important for farmers and ranchers to produce food, clothing, forest and floral products on less land for more people. Plant nutrients play a crucial role in improving agricultural efficiency.
Students will be our leaders and decision-makers in the future. It is essential for our industry to educate young people about the challenges facing agriculture, and the delicate balance between maximizing production and minimizing environmental impacts. CFAITC has developed four units of lesson plans focusing on agriculture and plant nutrients and wants to increase implementation of these lessons in elementary, middle, and high school classrooms through the development of a promotion plan. All educators should be aware that these free resources are available and will help them address California Content Standards though hands-on lessons that are related to the food we eat every day.

This project included promoting four comprehensive plant nutrient units, grade levels K-12, to current California Education Standards, sharing the units with current and new audiences, working with science centers throughout the state to train teachers and use the curriculum in their summer and afterschool programs, and creating new packaging to draw interest to the program.

E. Work Description

Work Plan Year 1 (2015)

Project Task & Description	Product/Results	Completed Date
1. Engage marketing partners and public relations agency	Determine interest in project	Dec 2015
2. Meet with selected marketing partners and public relations agency	Review and plan strategies to market CFAITC plant nutrient curriculum to teachers and organizations and to track outreach	January 2016
3. Print copies of each of the four plant nutrient units and upload to new Plant Nutrients web page	Printed 500 of Educator's Guide to Fun with the Plant Nutrient Team unit and 1,000 each of other units. Attract 500 visitors to Plant Nutrients web page	December 2015
4. Begin placing advertisements for CFAITCs plant nutrient curriculum in educational publications	Include Ca. Science Teacher Assoc., Golden Slate and publications as specified by marketing partners	December 2017
5. Promote plant nutrient lessons in CFAITC's monthly e-newsletter, Cream of the Crop	Include all California school administrators on mailing list	January 2016
6. Fulfill orders for plant nutrient units	Provide free resources to educators	December 2015
7. Research and interview evaluation specialists	Evaluation of outreach and teaching of units	November 2015
8. Meet with selected evaluation specialist	Review and plan strategies to measure student learning in sample of classrooms using CFAITC's plant nutrient curriculum with lab kits	January 2016
9. Develop student assessments	Evaluation specialist will work with CFAITC to develop student assessments to accompany each of the four plant nutrient units	May 2016

10. Design selection process for 60 educators to receive lab kits to accompany plant nutrient units	Work with marketing partners and evaluation specialist on educator selection process. Also work with organizations such as CFF for selection and distribution to educators.	June 2016
11. Prepare 60 lab kits	Purchase lab equipment to enhance lessons from plant nutrient units. Assemble 60 lab kits.	June 2016
12. Choose 60 educators to receive lab kits	Educators agree to participate in webinar training and student evaluation including 5 teachers from the CFF grant program.	August 2016
13. Communicate with educators receiving lab kits through webinar	Provide instructions on lab kit use with lessons and evaluation procedures via webinar	August 2016
14. Mail lab kits to educators who participated in webinar	Provide lab kits to teachers for additional classroom support	September 2016
15. Attend at least one regional science educator conference	Promoted at 2015 CSTA Conference in Sacramento	October 2015
16. Outreach Activities (two additional – annual conference round table, or news article or web page)	Promote lessons and share other agriculture opportunities (REV up conference, website, and via social media)	December 2015

Work Plan Year 2 (2016)

Project Task	Product/Results	Completion Date
1. Print copies of each of the four plant nutrient units	Have resource available for ordering	December 2016
2. Fulfill orders for plant nutrient units	Supply educators with free resource	December 2016
3. Analyze outreach results	Work with marketing partners to evaluate outreach for 2016, plan strategy for Summer/Fall 2016 and 2017	June 2017
4. Educators participating in evaluation use lessons in class and complete surveys	Guidance provided from CFAITC and evaluation specialist	December 2016
5. Gather and analyze evaluations	Work with evaluation specialist to assess students learning from units	December 2016

6. Compile survey results	Data for report and for improving units and/or information to assist teachers in educating students	December 2016
7. Attend at least one regional science educator conference	Promote units – Bay Area STEM Conference, California Agriculture Teacher Association Conference and National Ag in the Classroom Conference	June 2016
8. At least one science center uses new plant nutrient curriculum in their vacation or afterschool programs.	Promote plant nutrient lessons	August 2016

Work Plan Year 3 (2017)

Project Task	Product/Results	Completion Date
1. Print copies of each of the four plant nutrient units	Have available for ordering	November 2017
2. Fulfill orders for plant nutrient units	Provide free resources to educator requests	December 2017
3. Attend at least one regional science educator conference	Promote plant nutrient units – San Mateo County STEM Conference, Soil Born Farms Garden Symposium, STEM Power After School Conference, California School Garden Network "Farm to School" Conference, National Science Teachers Association Conference, Sac State: Feeding Our Future Conference, National Ag in the Classroom Conference	October 2017
4. Complete all components for plant nutrient web page	Page will be in various stages of production during 2015, 2016, 2017	December 2017
5. Data collection and compilation	Compile outreach and evaluation results to prepare final report on unit distribution, use, and learning outcomes	January 2018

F. Data/Results

Not applicable to this project.

G. Discussion and Conclusions

By the conclusion of this project we met all our objectives. We were able to connect with several educational partners, promote our resources to several new audiences, and provide our materials to all teachers who inquired. Based on our feedback, we see the importance of continuing to provide updated, relevant, and free resources to educators. Building from past FREP-funded projects we were able to continue growing our programs efforts. These resources will remain on our programs website as a tool for teachers, even after the grant timeline expires. Looking to the future, we feel it will be important to focus on new ways to engage California's diverse population of educators.

H. Project Impacts

By providing a resource that makes it as easy as possible for teachers to implement (aligned to standards/core subjects, provides background information, outlines required time and resources, etc.) we are showing educators how simple incorporating plant science and agriculture into learning environments can be. Every teacher who adopts our materials translates into numerous students receiving a type of education they would have otherwise missed out on. Even introductory lessons taught to students can spark interest in careers in plant science and a deeper appreciation and understanding of our industry.

I. Outreach Activities Summary

The following events were attended to either present the materials through a workshop or provide resources to educators.

- Council of Math/Science Educators of San Mateo County (CMSESMC) STEM Conference: Redwood City (2/6/16)
- Soil Born Farms Garden Symposium: Sacramento (2/27/16)
- San Diego County Office of Education (SDCOE) STEMpower After School Conference: San Diego (3/12/16)
- USTP presentations: UC Davis (2/17/16), CSU Monterey Bay (3/10/16 and 10/17/17), CSU Chico (5/20/16 and 12/8/17), CSU Monterey Bay (10/12/16), CSU Stanislaus (11/16/16 and 11/29-30/17), Butte College (11/27/17
- California Ag Day, State Capital (3/16/16 and 3/22/17)
- Cal Poly Open House, San Luis Obispo (4/16/16)
- Yolo County Farm Connection Day, Woodland (4/29/16 and 5/5/17)
- Project ESTEEM Panel (Experience Science, Technology, Engineering, Electronics, and Math), Chico (6/16/16)
- NAITC Conference: Litchfield Park, AZ (6/22-23/16 and 6/21-23/17)
- California Agriculture Teachers Association (CATA) Conference: San Luis Obispo (6/22/16 and 6/25/17)
- Region 5 REV Up Afterschool Conference, Gilroy (9/10/16)
- Yolo County Farm Bureau Teacher Grapes Day, Woodland (9/17/16)
- CFAITC Conference, Sacramento (9/23-24/16) and Visalia (7/14-14/17)
- Farm to Fork Festival, Sacramento (9/24/16 and 9/23/17)
- California Science Teachers Association (CSTA) Conference: Palm Springs (10/22/16) and Sacramento (10/13-15/17)

Our resources were highlighted in the following print and digital advertisement campaigns.

- Facebook Posts and Advertisements, January 2016 to December 2017 – 156,000 reached
- California Homeschool Network Program Listing, January 2017 to December 2017
- Homeschool.com Listing Post, May 2017
- Golden Slate Newsletter Advertisement, May 2017
- Banner Advertisement on CSTA Website, June 2017 to December 2017 – 10,500 reached
- CSTA Member Email Blast and Calendar Event Placed, June 2017 – 5,000 reached
- California Educator Magazine Advertisement, August 2017
- Target Online Advertisements with Multiview, August 2017 to December 2017 – 370,000 reached
- Targeted Emailing with Entercom, December 2017 – 72,500 reached

J. Factsheet/Database Template

1. Plant Nutrients in the Classroom
2. Grant Number: 14-0481-SA
3. Judy Culbertson, Executive Director of California Foundation for Agriculture in the Classroom, and Austin Miller, Program Coordinator for California Foundation for Agriculture in the Classroom.
4. 2015-2017
5. Various locations in California
6. Statewide
7. Highlights
    a. 225,000 students reached
    b. 8,700 teachers reached
    c. 614,000 estimate media reach
    d. Promotion of updated educational materials
8. As a $43.5 billion industry, California continues to lead the nation in agriculture production. Challenges within the industry are numerous and California producers continually investigate the solution to feeding a growing population with finite resources. With these challenges in mind, it is increasingly important for farmers and ranchers to produce food, clothing, forest and floral products on less land for more people. Plant nutrients play a crucial role in improving agricultural efficiency.
   Students will be our leaders and decision-makers in the future. It is essential for our industry to educate young people about the challenges facing agriculture, and the delicate balance between maximizing production and minimizing environmental impacts. CFAITC has developed four units of lesson plans focusing on agriculture and plant nutrients and wants to increase implementation of these lessons in elementary, middle, and high school classrooms through the development of a promotion plan. All educators should be aware that these free resources are available and will help them address California Content Standards though hands-on lessons that are related to the food we eat every day.
9. This project created a comprehensive outreach plan to promote and distribute updated and accurate plant nutrient curriculum to teachers throughout California. We promoted

our materials through educational conferences, educator trainings, print and digital advertising, and media outlets.

10. At the completion of the project, we distributed 7,500 physical copies and 1,200 digital copies of the updates units. This equates to 225,000 students. The demand of the materials suggests that teachers are interested in science-based and free agricultural education materials.

K. Copy of the Product/Result

See documents sent via WeTransfer.